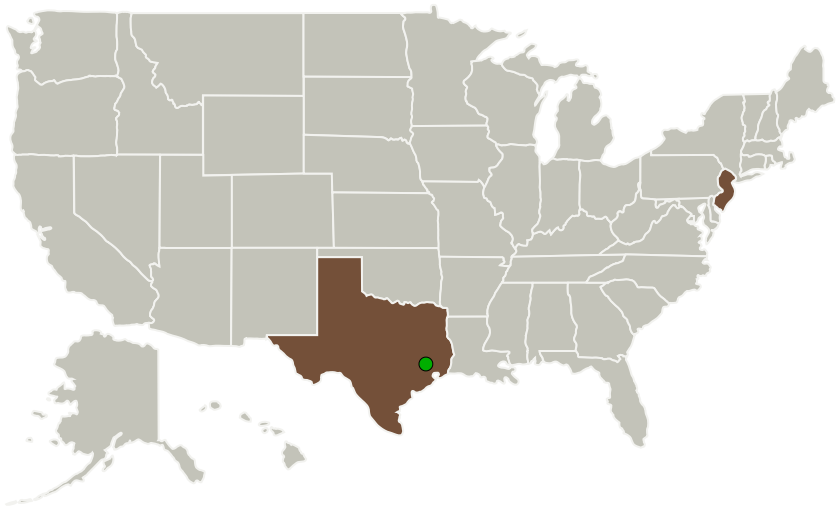
A Novel Approach to Highly Damage Tolerant and Abrasion Resistant EVA Gloves, Phase I

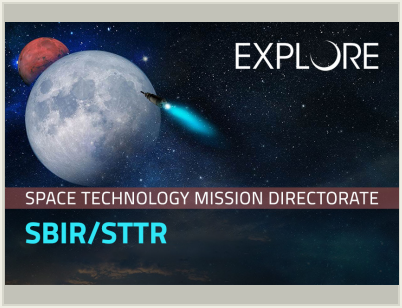
Completed Technology Project (2012 - 2012)

Project Introduction

As part of the spacesuit pressure garment, the EVA glove incorporates a silicone pad on the palm for protection of the bladder from cuts and punctures. Repeated gripping and rotational motion cause delamination of the silicone pad from the underlying Vectran® fabric. In addition, frequent scuffing causes damage to the palm pad and loss of material and material functions. Improving adhesion of the silicone layer with the underlying fabric, and enhancing the overall mechanical properties of the glove surface, will beneficially impact extravehicular activities by the astronauts. In Phase I, we propose to demonstrate the feasibility of developing a silicone nanocomposite palm pad material with enhanced adhesive and mechanical properties, and the ability to self-heal scratches and microcracks. The novel silicone nanocomposite combines a nanoscale additive and a self-healing agent into a unique structure in ways never done before. The program is a collaborative effort with a NASA spacesuit contractor. Test coupons with a silicone nanocomposite coating on Vectran® fabric will be used to demonstrate proof of concept. The Phase II program will build upon the Phase I demonstration effort by implementing the technology in a prototype glove assembly.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
NEI Corporation	Lead Organization	Industry Small Disadvantaged Business (SDB)	Piscataway, New Jersey
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
New Jersey	Texas

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137836)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

NEI Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

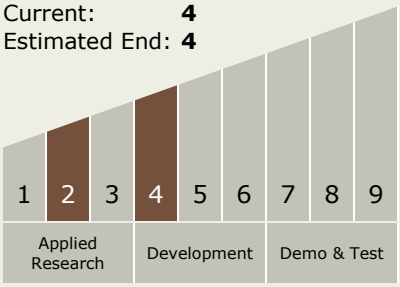
Carlos Torrez

Principal Investigator:

Runqing Ou

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.1 Pressure Garment

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System